

CLAIMS

1. A surface fastener (1) comprising: a first surface fastener member (10) having a plurality of engaging elements (12) on a surface of a first flat base material (11); and a second surface fastener member (20) having a plurality of engaging elements (22) on a surface of a second flat base material (21), the second surface fastener (20) being joined to the first surface fastener member (10) through a plane,

being characterized in that at least one of the first and second surface fastener members (10, 20) has noise suppressing means and auxiliary engaging and disengaging means which engages and disengages from a mating one without generation of a noise at a time of engagement or disengagement, and

a level of a peeling noise is 80 dB or less.

2. The silent surface fastener according to claim 1, wherein both the first and second surface fastener members (10, 20) are fiber products.

3. The silent surface fastener according to claim 1, wherein both the first and second surface fastener members (10, 20) include a synthetic resin molded article.

4. The silent surface fastener according to claim 1, wherein the first surface fastener member (10) includes a synthetic resin molded article, and the second surface fastener member (20) is a fiber product.

5. The silent surface fastener according to claim 2 or

4, wherein the engaging elements (12, 22) are engaging elements (12a, 22a) formed integrally on the surfaces of the flat base materials (11, 22) made of a fiber material, and

the noise suppressing means satisfies at least any of following requirements (a) to (c):

(a) element density of the engaging elements (12a, 22a) is 35 (pieces/cm²) or less;

(b) tensile strength of the engaging elements (12a, 22a) is 2.5 to 5.0 (cN/T) and elastic modulus of the engaging elements (12a, 22a) is 19.0 to 38.0 (cN/T); and

(c) apparent density of the first and second flat base materials (11, 21) is 0.5 (g/cm²).

6. The silent surface fastener according to claim 3 or 4, wherein the engaging elements (12, 22) are engaging elements (12b, 22b) formed integrally on the surfaces of the flat base material (11) obtained by molding a synthetic resin material, and

the noise suppressing means satisfies at least any of following requirements (d) and (e):

(d) element density of the engaging elements (12b, 22b) is 250 (pieces/cm²) or less; and

(e) tensile strength of the engaging elements (12b, 22b) is 50 (MPa) or less and elastic modulus of the engaging elements (12b, 22b) is 1.1 (GPa) or less.

7. The silent surface fastener according to claim 5 or

6, wherein the noise suppressing means includes a fact that a value of a ratio (A/B) between an area A of a region in which an acoustic spectrum of the peeling noise Fourier-transformed in a region of 100 Hz to 15000 Hz is 100 Hz to 3000 Hz and an area B of a region in which the acoustic spectrum of the peeling noise Fourier-transformed in the region of 100 Hz to 15000 Hz is 3000 Hz to 15000 Hz is 0.4 or more.

8. The silent surface fastener according to any one of claims 1 to 7, wherein the auxiliary engaging and disengaging means is engaging and disengaging means using any one of magnetism, adhesiveness, suction, fitting and temperature transformation or a combination of them.

9. The silent surface fastener according to claim 2, 4 or 5, wherein respective flat base materials (11, 21) made of fiber are a fiber woven fabric, a fiber knitted fabric or an unwoven fabric.

10. The silent surface fastener according to claim 1, wherein respective engaging elements (12, 22) of the first and second surface fastener members (10, 20) have a hook-like shape, a mushroom-like shape or a modified shape thereof.

11. A surface fastener (1) comprising: a first surface fastener member (10) having a plurality of engaging elements (12) formed integrally on a surface of a first flat base material (11) made of a fiber material; and a second surface fastener member (20) having a plurality of engaging elements (22) formed

integrally on a surface of a second flat base material (21) made of a fiber material, the second surface fastener member (20) being joined to the first surface fastener member (10) through a plane,

being characterized in that at least one of the first and second surface fastener members (10, 20) has noise suppressing means in which density of the engaging elements is low and auxiliary engaging and disengaging means having magnetism which joins itself to a mating one without generation of a noise at a time of engagement or disengagement, and

a level of a peeling noise is 80 dB or less.

12. The silent surface fastener according to claim 11, wherein the density of the engaging elements is 35 (pieces/cm²) or less.

13. The silent surface fastener according to claim 11 or 12, wherein the auxiliary engaging and disengaging means using magnetism is a magnetic linear material having magnetism.

14. The silent surface fastener according to claim 13, wherein respective flat base materials (11, 21) are a foundation structure constituted of a weaving structure or knitting structure composed of warps and wefts, and the warps and/or wefts comprise the magnetic linear material having magnetism.

15. The silent surface fastener according to claim 14, wherein the respective flat base materials (11, 21) are joined to each other by magnetically attracting the foundation

structures including the magnetic linear material having magnetism.

16. The silent surface fastener according to claim 11 or 12, wherein respective engaging elements (12, 22) include engaging elements (12, 22) having magnetism.